RCx Program & UESC

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Agenda

- ❑ What is RCx?
- ❑ PG&E's RCx Program
- ❑ RCx and UESC

What is RCx?

A systematic process for optimizing performance of a facility's existing equipment, lighting controls, processes, and control systems

A building tune-up using a facility's existing equipment:

- ***Lighting Controls***
- ***HVAC Controls & Processes***
- ***Control Systems***

Common RCx Measures

Measures are determined on a site-by-site basis.

Scheduled Loads
- Equipment Scheduling: Time of Day
- Equipment Scheduling: Optimum Start-Stop
- Equipment Scheduling: Lighting Controls

Economizer/Outside Air Loads
- Economizer Operation: Inadequate Free Cooling
- Over-Ventilation

Control Problems
- Simultaneous Heating and Cooling
- Sensor/Thermostat Calibration
- Hunting and Loop Tuning
- Damper/Valve Actuator Calibration

Controls: Setpoint Changes
- Duct Static Pressure Setpoint
- Piping Differential Pressure Setpoint
- Reduction of VAV Box Minimum Setpoint

Equipment Maintenance
- Leaking Valves (hot water or chilled water valves)
- Actuator / Damper Operation

Controls: Reset Schedules
HW Supply Temperature Reset or HW Plant Scheduling
CHW Supply Temperature Reset
Supply Air Temperature Reset:
Cooling and Heating
Duct Static Pressure Reset

Equipment Efficiency Improvements / Load Reduction
- De-Lamping of Over-Lit Spaces
- Pump Discharge Throttled, Over-Pumping and Low Delta T–Trim Impeller

Variable Frequency Drives (VFD)
- VFD Retrofit – Fans
- VFD Retrofit – Pumps
- VFD Repair

Process Systems
- Control system repairs and system optimization.
- System component optimization

Program Overview
Examples of RCx Eligible Measures

What's Eligible:

- Tuning VAV controls to eliminate simultaneous heating and cooling
- Tuning and repairing economizers
- Reprogramming building controls
- Calibrating sensors
- Adding sensors and control points
- Resetting chilled and hot water set points
- Pneumatic to DDC Conversion (assuming coincident documented energy savings)

What's Not:

- Lamp, ballast & fixture replacements
- Replacement of existing motors with premium efficiency motors
- Major plant or distribution measures
- Short-term, routine maintenance items
- Fuel switching measures
- Measures that do not save energy (except indoor air quality measures)

PG&E's RCx Program

PG&E Provided Support : operational efficiency

- **Investigate Measures**
- **Catalog Measures and Resolutions**
- **Site Measurements**
- **Develop the Baseline & Calculate Potential Savings**
  - **Modeling (BIN Temp Analysis, Building Simulation)**
- **Verify Measures are installed and Functioning Properly**
- **Educate Customer to Maintain Persistence**

- **PG&E Also Provides Incentives**

Incentives

$100/on-peak kW, $0.09/kWh, and $1/therm annual achieved savings

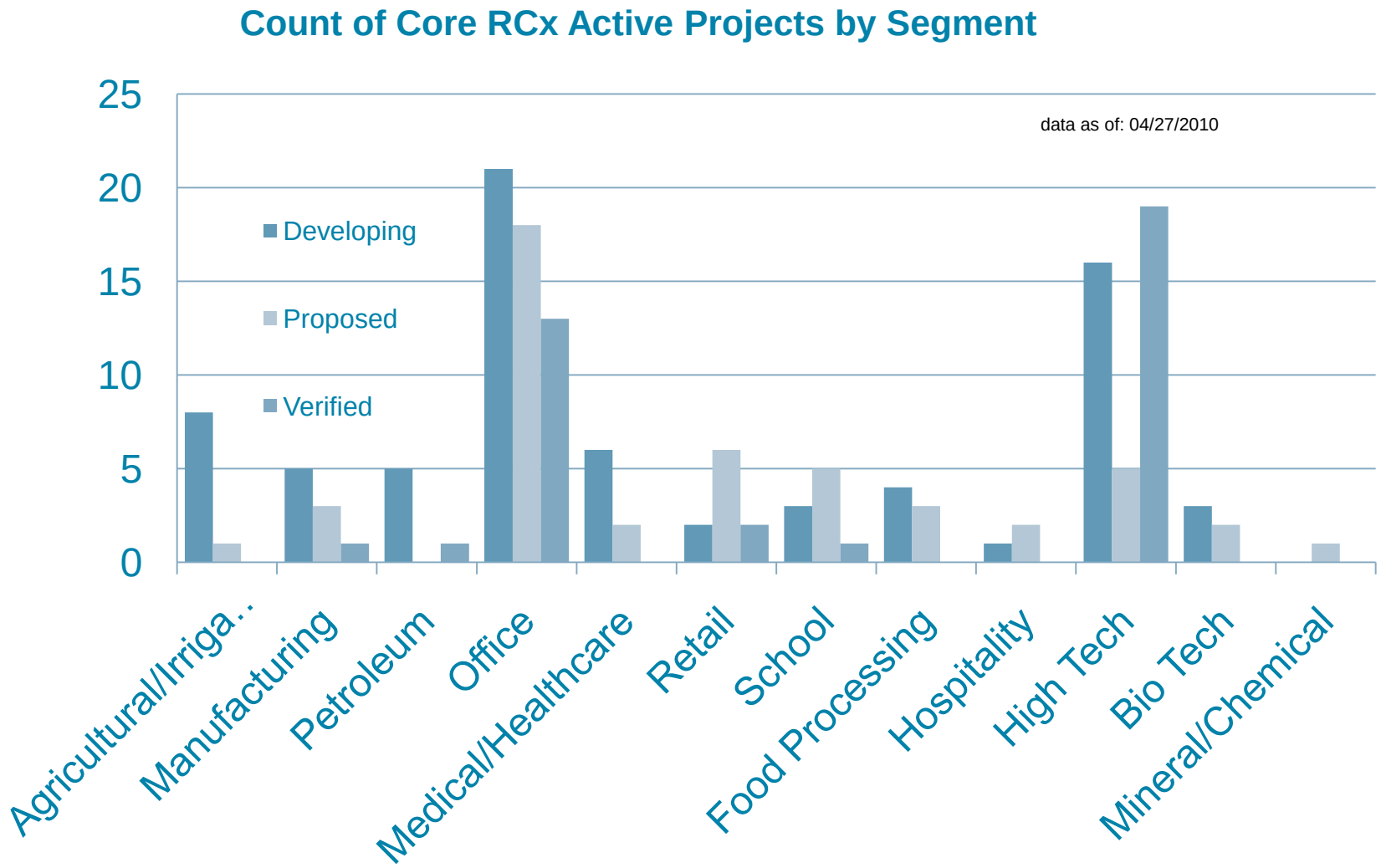
Capped at 50% of measure cost

Eligible Customers: All Market Segments

Ideal Segments:

- **Large Commercial: In general, >100,000 square feet, 2M kWh, *or* 500 kW**
- **Industrial and Manufacturing:**
- **Refineries and Food Processing**
- **Hightech/Biotech:**
- **Data centers, labs, clean rooms**

Active Projects Across Segments



Program Overview
RCx Benefits and Considerations

Benefits

- Reduced energy costs
- Reduced energy consumption (5-15%)
- Short measure payback (<4 yrs)
- Thorough facility assessment
- Project implementation support
- Improved occupant comfort, reduced service calls

Considerations

- Process takes time
- Requires significant PG&E investment
- Requires staff commitment from customer
- Not yet set up to service smaller customers

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Incorporating RCx & UESC

UESC Example Project

- Pneumatic Zone Wireless DDC T-Stat from Cypress Envirosystems (~1750 zones in 13 Buildings)
- Expansion of DDC Ethernet network to upgraded buildings
- Enhanced control sequences for chilled water systems and air handlers
- Adjustment of building zone minimum/heating air flow set points
- Repair of malfunctioning zone controls
- Demand flow chilled water plant optimization

Incorporating RCx & UESC

UESC Example Project Results -

- RCx Savings:
  - Electricity: 3,268,390 kWh
  - Demand: 149.2 kW
  - Nat. Gas: 168,001 therms

- Percent of UESC project saving:
  - Electric: 36%
  - Nat. Gas: 13%

UESC Projects w/RCx

RCx Moving Forward

- Incorporate into all known energy audit opportunities.
  - Investment, Integrated and Scoping Grade Audits

Q&A